DEREGULATION AND PREDATION IN LONG-DISTANCE TELECOMMUNICATIONS: AN EMPIRICAL TEST

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I. Introduction

Economists (and corporate managers) have long recognized that regulatory processes can be used strategically to subvert competition.[1] In certain situations, a firm or group of firms may be able to convince legislators and/or regulators that some given constraint that reduces the ability of rivals to compete effectively is in the public interest. Where such attempts are successful, the regulatory power of the state is enlisted as a vehicle to raise these rivals' costs and, thereby, reduce the intensity of competition.[2] Moreover, the ability of firms to distort regulatory decisions in this fashion frequently arises from the strategic use of antitrust issues or competitive concerns. That is, one group of firms will convince regulators that, in the absence of the recommended constraint, certain anticompetitive consequences will be forthcoming.

Clearly, the ability of firms to employ the regulatory process to achieve strategic anticompetitive ends rests heavily on the inability of regulatory officials and their staffs to accurately assess both the legitimacy of proponents' claims and the competitive consequences of their own actions. That inability, in turn, stems from a general lack of expertise and experience among regulators in evaluating what are traditionally antitrust questions, such as market definition, entry conditions, market power, and predation. The adjudication of rate cases under conditions of entry-blockaded franchise monopoly provides neither opportunities to develop nor

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[1]See William J. Baumol and Janusz A. Ordover, "Use of Antitrust to Subvert Competition," *Journal of Law and Economics*, Vol. 28 (1985), pp. 247-266.

[2]On the profitability of raising rivals' costs, see Steven C. Salop and David J. Scheffman, "Raising Rivals' Costs," *American Economic Review*, Vol. 73 (May 1983), pp. 267-271; and Thomas G. Krattenmaker and Steven C. Salop, "Anitcompetitive Exclusion: Raising Rivals' Costs to Achieve Power Over Price," *Yale Law Journal*, Vol. 96 (December 1986), pp. 209-293.

requirements to hold expertise in the economics of market power. As a result, regulators are often susceptible to self-serving claims of anticompetitive conduct by rivals and the strategic obfuscation that generally accompanies such claims.

This ability of rival producers to turn regulators' uncertainty to their own advantage in the marketplace has been prominently displayed in the post-divestiture long-distance telecommunications industry. Here, the emergence of competitive market forces in the presence of pervasive regulation has created a fertile environment for the strategic use of regulation to gain market advantages. Specifically, AT&T's competitors and would-be competitors have raised various allegations and/or concerns about, *inter alia*, monopoly pricing, predatory pricing, and tacit collusion. These claims have surfaced and resurfaced in regulatory hearing rooms throughout the country, in both state and federal legislatures, and in federal court.

The major consequence of these allegations of potential anticompetitive abuses has been to extend direct regulatory controls over the pricing decisions of AT&T well beyond the time frame warranted by objective market conditions. The excruciatingly slow pace of deregulation of long-distance telecommunications has led one commentator to write:

> "Undoubtedly, the greatest surprise in telephone industry deregulation has been the absence of deregulation, for the industry continues to be almost as highly regulated today as twenty years ago."[3]

This observed policy lethargy is due, at least in part, to allegations and resulting fears that AT&T will behave anticompetitively in the absence of regulatory controls over its pricing

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[3]Robert W. Crandall, "Surprises from Telephone Deregulation and the Divestiture," *American Economic Review*, Vol. 78 (May 1988), p. 323.

decisions. One such argument advanced by proponents of continued regulation is that predatory pricing may emerge in this market in a deregulated environment.[4] Moreover, recent empirical evidence confirms the fact that relaxed regulation of AT&T has led to lower prices for its interLATA services.[5] The question, then, is whether these prices are, indeed, predatory or, instead, the outcome of aggressive but legitimate competition. This paper addresses that question.

It does so in three substantive sections. First, in Section II, we describe the theoretical and historical foundation behind the allegation that predatory pricing by AT&T is a plausible strategy in the current market environment. Next, in Section III, we propose a simple empirical test that is capable of distinguishing between the competing hypotheses of aggressive competition versus predatory pricing. And in Section IV, we describe our data and present the empirical results obtained from application of that test. Finally, Section V concludes that paper.

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[4]Robert W. Crandall, "Relaxing the Regulatory Stranglehold on Communications," *Regulation* (Summer 1992), p. 31, writes: "AT&T, however, remains fully regulated under the commission's dominant carrier rule. The theory of that rule is that a 'dominant' carrier could exercise predatory power over its smaller rivals—driving them from the market and subsequently raising rates."

[5]See Alan D. Mathios and Robert P. Rogers, "The Impact of Alternative Forms of State Regulation of AT&T on Direct-Dial, Long-Distance Telephone Rates," *RAND Journal of Economics*, Vol. 20 (Autumn 1989), pp. 437-453; and Robert Kaestner and Brenda Kahn, "The Effects of Regulation and Competition on the Price of AT&T Intrastate Telephone Service," *Journal of Regulatory Economics*, Vol. 2 (1990), pp. 1-15.

II. Is Predation Plausible in the Long-Distance Market? The Debate

Even in the presence of considerable uncertainty on the part of regulators regarding the veracity of predatory pricing allegations, the success of proponents of continued regulation will hinge, at least partially, upon the economic plausibility of such behavior in the long-distance market. That is, while regulators' lack of experience and expertise in adjudicating antitrust issues renders them relatively susceptible to strategic claims of this sort, it does not guarantee success for totally and obviously meritless arguments. A plausible case must still be made that the alleged anticompetitive behavior is a feasible strategy.

The plausibility of predatory pricing by AT&T in the long-distance market depends critically upon the presence or absence of the structural characteristics widely recognized as constituting necessary conditions for such pricing behavior to be profitable.[6] In the absence of regulation, these conditions require: (1) the presence of significant market power in one or more of the alleged predator's markets, and (2) the existence of substantial barriers to entry into the market targeted for predation. In the absence of the former condition, the firm will lack the requisite control over market price to enable it to drive that price to predatory levels. And in the absence of the latter condition, the firm will be unable to recoup its predation-period losses with post-predation profits due to the threat of entry (or reentry).[7] The question, then, is whether the

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[6]For a more thorough treatment of the economics of predatory pricing, see Chapter 4 of David L. Kaserman and John W. Mayo, *Government and Business: The Economics of Antitrust and Regulation*, The Dryden Press, Ft. Worth, TX, 1995.

[7]Interestingly, it is generally believed that the presence of regulation increases the likelihood that predation will be profitable. By restraining the firm's ability to capture the profits available in its monopoly market(s) regulation provides an added incentive to seek these profits in the firm's other (unregulated) markets. Also, where regulation ties approved prices to the

above conditions are present in the post-divestiture long-distance market. If they are present, then claims that deregulation might result in predatory pricing have at least a modicum of plausibility.

The authors of this paper, along with several other economists, have argued elsewhere that the necessary conditions for predatory pricing to arise are not met in this market and, therefore, that deregulation will not result in this sort of anticompetitive behavior.[8] That argument has focused, *inter alia*, upon: (1) AT&T's current market share (particularly where that share is measured on the basis of capacity); and (2) the absence of significant barriers to entry into the long-distance market (as demonstrated by the entry of over 400 firms over the past decade or so).[9] That is, we have argued that, with a capacity-based market share of less than 50 percent and low barriers to entry, it would not make sense for this firm to pursue predatory pricing. As a result, the structural conditions in this industry cannot sustain an allegation of predation; and, therefore, such an allegation does not pass the incentive logic filter endorsed by

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firm's accounting costs, incentives for cross-subsidization from monopoly to competitive markets through cost shifting can arise. See Timothy J. Brennan, "Cross-Subsidization and Cost Misallocation by Regulated Monopolists," *Journal of Regulatory Economics*, Vol. 2 (1990), pp. 37-51. Also, see Mark Sievers and Brooks Albery, "Strategic Allocation of Overhead: The Application of Traditional Predation Tests to Multiproduct Firms," *Antitrust Law Journal*, Vol. 60 (1992), pp. 757-784.

[8]See, e.g., David L. Kaserman and John W. Mayo, "The Ghosts of Deregulated Telecommunications: An Essay by Exorcists," *Journal of Policy Analysis and Management*, Vol. 6 (Fall 1986), pp. 84-92; and Michael L. Katz and Robert D. Willig, "The Case for Freeing AT&T," *Regulation* (July/August 1983), pp. 43-49.

[9]Federal Communications Commission, *Statistics of Common Carriers*, 1992-93.

the court in the *Matsushita* case.[10] Therefore, claims that predation is likely should be dismissed as implausible.

That argument, however, has met countervailing claims that: (1) the more relevant market share figure is based upon sales, and that share still remains at roughly 60 percent; and (2) there are substantial barriers to entry into the market as a facilities-based carrier.[11] On these grounds, proponents of continued regulation have argued that predation by AT&T is a viable and potentially profitable strategy. Consequently, they claim that regulatory oversight of AT&T's pricing decisions remains a prudent safeguard to protect emerging competition in this market.

Moreover, these claims take on an added air of legitimacy when one recounts the pre-divestiture history of AT&T's market behavior under the integrated Bell System.[12] Apparently, from the very earliest stages of the development of the telecommunications industry, this firm pursued a variety of openly predatory tactics. For example, Weiman and Levin have recently documented Southern Bell Telephone Company's use of such tactics over the period from 1894 to 1912.[13] The evidence these authors present suggests that, during this period, this company

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[10]*Matsushita Electric Industrial Co. v. Zenith Radio Corp.*, 475 U.S. 574 (1986). For a discussion of the economics of this case, see Kenneth G. Elzinga, "Collusive Predation: *Matsushita v. Zenith*," in *The Antitrust Revolution*, John E. Kwoka and Lawrence J. White, editors, Scott, Foresman, Co., Glenview, IL, 1989.

[11]See William G. Shepherd, "Long-Distance Telephone Service: Dominance in Decline?" in *Industry Studies*, Larry L. Duetsch, editor, Prentice Hall, Englewood Cliffs, NY, 1993.

[12]Several excellent accounts of this history have appeared in recent years. See, e.g., Gerald W. Brock, *The Telecommunications Industry: The Dynamics of Market Structure*, Harvard University Press, Cambridge, MA, 1981.

[13]David F. Weiman and Richard C. Levin, "Preying for Monopoly? The Case of Southern Bell Telephone Company, 1894-1912," *Journal of Political Economy*, Vol. 102 (February 1994), pp. 103-126.

engaged in: (1) predatory pricing, (2) discriminatory interconnection, (3) preemptive investment, and (4) strategic use of regulation. The end result of this pattern of predatory conduct was the formation and solidification of a near-monopoly over telephone services in the southeastern U.S.

Also, such behavior does not appear to have ceased after the firm came under the jurisdiction of the Federal Communications Commission, which was formed with passage of the Communications Act of 1934. Numerous complaints and regulatory rulings were issued over the next five decades, many of which dealt with allegations of predatory conduct. In addition, numerous antitrust suits (both private and public) were filed against AT&T over this same period. While some of these suits were settled, 49 antitrust cases against AT&T were still pending in 1979.[14] Thus, in attempting to respond to arguments that deregulation might lead to predation, AT&T has had to bear the burden of unclean hands. Although the 1984 divestiture arguably has removed the structural conditions that caused this prior pattern of conduct, the need to explain this point creates yet another hurdle in the struggle to obtain deregulation.

Thus, regulators have been confronted with opposing arguments about the likely consequences of deregulating AT&T. Moreover, to follow these arguments requires regulators to traverse the rather difficult terrain of antitrust economics, which they are frequently unable or unwilling to do. Consequently, in the presence of these competing claims, they have been frozen into inaction by their inability to confidently weight the relative merits of each side's arguments. As a result, regulators have frequently taken what they perceive to be the safe route, maintaining

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[14]Gerald W. Brock, *The Telecommunications Industry: The Dynamics of Market Structure*, Harvard University Press, Boston, MA, 1981, p. 287.

existing (or only slightly modified) regulatory controls over AT&T's pricing decisions while ignoring appeals for more complete deregulation.

Nonetheless, a number of states have chosen to relax substantially the stringency of the regulatory constraints imposed on these decisions. Specifically, as of 1992, 29 states have removed rate-of-return regulation of this firm's intrastate operations. As a result, it is now possible to test empirically whether this first step toward deregulation has brought forth the sort of predatory conduct predicted by proponents of continued regulation. While such a test obviously must be accompanied by several important caveats, it provides some crucial evidence regarding the merits of the conflicting arguments regarding the likelihood of predation in this market. We turn, now, to describe that test.

III. Testing For Predation

In a typical antitrust case involving an allegation of predatory pricing, an attempt is made to distinguish (legal) aggressive competition from (illegal) predation by comparing the defendant's prices to its costs. The various infirmities of this approach are well known.[15] For example, the relevant costs for such a comparison are the marginal economic costs, while the observed costs are the average variable (and sometimes the average total) accounting costs. There is no reason whatsoever for the latter to approximate the former with any reasonable

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[15]See, e.g., William J. Baumol, "Quasi-Permanence of Price Reductions: A Policy for Prevention of Predatory Pricing," *Yale Law Journal*, Vol. 89 (1979), pp. 1-26; and Oliver E. Williamson," Predatory Pricing: A Strategic and Welfare Analysis," *Yale Law Journal*, Vol. 87 (1977), pp. 284-340. For a survey of much of this literature, see Janusz A. Ordover and Garth Saloner, "Predation, Monopolization, and Antitrust," in *Handbook of Industrial Organization*, Vol. 1, Richard Schmalensee and Robert D. Willig, editors, North Holland, New York, 1989.

degree of accuracy. Also, short-run competitive equilibrium does not rule out prices that fall well below average total costs. Therefore, substantial losses and even exit are not inconsistent with legitimate competitive behavior. Indeed, such losses and exit are an essential part of the normal process of market adjustment to a decline in demand.

As a result, judicial attempts to distinguish predatory from competitive behavior are notoriously inexact. In fact, the general inability to make this distinction accurately, together with the chilling effect that unwarranted prosecution of innocent firms can have on the intensity of market forces generally, have led some observers to recommend eliminating predatory pricing as a separate actionable offense under our antitrust laws.

Here, we adopt a different approach to test for predation. This approach relies upon the necessary effects of successful predation on the number of firms competing in the market. Specifically, where predation is occurring, exit should be observed. By focusing upon observed entry and exit in the market(s) in which predation is alleged to be taking place, we can avoid many of the pitfalls of the more traditional approach of comparing prices to costs. Moreover, this outcomes-based approach has the advantage of being capable of testing for predatory behavior of any sort. That is, it is not limited to predatory pricing alone.[16]

Because observed exit is a necessary but not sufficient condition to infer predation, however, this approach is not capable of distinguishing competition from predation in all cases. That is, firms leaving a market may be consistent with either competition or predation. But entry, or simply the lack of exit, is clearly inconsistent with predation. Therefore, a test based on

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[16]At the same time, however, because the test relies on observed exit, it cannot detect purely preemptive behavior that retards entry but does not actually drive existing firms from the market. Nonetheless, observed entry rejects the hypothesis of successful preemptive behavior.

observed changes in the number of firms is broadly analogous to the incentive logic filter analysis applied in the *Matsushita* case. It can reject the hypothesis of predation, but it cannot confirm it.

Implementing this test in the long-distance telecommunications market, then, requires an examination of the effects of relaxed regulation of AT&T on the number of firms competing in the various intrastate markets. If the proponents of continued regulation of AT&T are correct, then removal of rate-of-return controls over this firm's pricing decisions should lead to predation which, in turn, should lead to observed exit. Therefore, an empirical test of the impact of relaxed regulation of AT&T on the number of interexchange carriers competing in intrastate long-distance markets provides an initial test of the predation hypothesis.

We conduct this test in two phases. First, we begin with a simple comparison of the number of firms and the change in the number of firms in states that have removed rate base regulation of AT&T and states that have retained such regulation. Table 1 reports the relevant means and corresponding t-statistics for these comparisons.

Here, $\bar{N}$ represents the average number of firms in states with and without rate-of-return regulation of AT&T in 1990 and 1992. The variable $\overline{\Delta N}$ is the change in the average number of firms in these two categories of states, where this change is measured against the base year 1986. The t-values reported to the right test the hypothesis of equality between the means. Because none of these t-statistics is significant at normal levels of acceptance, we are unable to reject the hypothesis that these means are equal. That is, there is no significant difference between the average number of firms or the average change in the number of firms in states that have relaxed regulatory controls over AT&T and states that have not relaxed these controls.

TABLE 1
Comparison of Mean Number of Carriers

Year = 1990

Status of AT&T's Regulation

	Rate-of-Return	Relaxed	t-value
$\tilde{N}$	55.94	46.82	1.04
$\overline{\Delta N}$	-6.35	-9.22	0.45

Year = 1992

Status of AT&T's Regulation

	Rate-of-Return	Relaxed	t-value
$\tilde{N}$	67.82	50.55	1.47
$\overline{\Delta N}$	-5.09	-2.76	-0.32

Thus, this simple empirical test suggests that relaxation of direct regulatory controls over AT&T's pricing decisions has had no significant impact on the number of firms competing in intrastate long-distance markets. This result, in turn, suggests that the increased pricing flexibility realized by this firm under reduced regulation has not been used for predatory purposes. While prices have fallen, they have not driven rival producers from the market.

The principal caveat associated with this simple test is that it fails to control for other potentially important variables that could influence observed entry and exit decisions. Long-distance markets have experienced very dynamic changes over the past decade that could significantly affect the observed number of competitors. Therefore, our test can be strengthened considerably by controlling for these other influences by specifying and estimating a more

complete model of entry and exit in these markets. Such a model is developed in the following section.

IV. An Empirical Model of the Number of Firms in Intrastate Long-Distance Markets

To control for other variables that may have influenced the entry and exit decisions of firms competing in the long-distance market in the various states, we specify and estimate a simple econometric model of the number of long-distance carriers in these states. The dependent variable for this model is the number of firms in each state in 1990 and 1992, which we denote by N. Our model then contains seven explanatory variables.

First, we include a variable measuring the number of carriers in each state in 1986, N86. This variable is incorporated to control for any entry/exit decisions that had already been made in these states prior to the introduction of relaxed regulation.[17] In general, states with relatively more firms in 1986 are expected to continue to have relatively more firms in 1990 and 1992 as well. Therefore, we expect a positive coefficient for this variable.

Second, to control for the overall size of the market, we include INTRAMIN, which is the total number of minutes of toll traffic (both interLATA and intraLATA) carried within the state. Ceteris paribus, a larger market should support a larger number of firms. Therefore, we hypothesize a positive sign for the coefficient of this variable.

Third, because business customers are typically more intensive users of long-distance services than residential customers, it is generally more profitable to serve the former.

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[17]A few states had already relaxed regulatory controls over AT&T by 1986 (e.g., Virginia). Nontheless, to control for prior entry/exit decisions, it seems advisable to observe the number of firms present at least two years after divestiture.

Therefore, we include a variable, BUSINT, which measures the number of business lines in the state relative to the total number of lines (business plus residential). Here, a positive coefficient is anticipated.

Fourth, to proxy the relative profitability of providing long-distance service in each state, we calculate the per-minute price of a typical long distance call minus the pre-minute access charges that the long-distance carriers must pay the local exchange companies in the state for obtaining access to the local network, PPA. Because access charges constitute the single largest expenditure on inputs for long-distance companies, this simple difference should correspond roughly to the profit earned per unit on the provision of long-distance calls in each state. Therefore, we hypothesize a positive coefficient for this variable.

Fifth, during the latter half of the 1980s, the equal access conversion process mandated in the 1984 divestiture order was unfolding in the telecommunications industry. Under this mandate, local exchange carriers were required to convert their switching equipment to provide the new long-distance carriers access to the local network that is equal in quality to that provided to AT&T. Such access eliminates the dialing disparities and signal transmission problems associated with the unequal access provided prior to conversion, thereby enabling these new firms to compete more effectively. Therefore, we include a variable, EA, which measures the percent of access lines in the state converted to equal access. Because equal access facilitates more effective competition by new entrants, we expect the coefficient of this variable to be positive.

Sixth, between 1984 and 1990/1992, many states opened their intraLATA toll markets to entry by interexchange carriers. These relatively short-haul toll markets had been assigned

exclusively to the local exchange companies at divestiture, with a provision that state regulatory authorities could open them to competition as they saw fit. By relaxing the regulatory barrier to entry to these markets, state commissions have expanded the volume of toll traffic available to the interexchange carriers, thereby encouraging additional entry. Thus, we incorporate a binary variable, INTRACOM, to indicate which states have opened their intraLATA toll markets to interexchange carrier entry. The coefficient of this variable is hypothesized to be positive.

Finally, an additional binary variable, DEREG, is included to reflect which states have removed rate-of-return constraints on AT&T's pricing decisions. This, of course, is the variable that is of primary interest here. If the relaxation of regulatory controls over AT&T has resulted in predatory behavior by that firm, then the coefficient of DEREG should be negative and significant.

Given the above discussion, the empirical relationship we seek to estimate is:

$$\begin{matrix} & + & + & + & + & + & + & ? \\ N = f(N86, & INTRAMIN, & BUSINT, & PPA, & EA, & INTRACOM, & DEREG), \end{matrix} \qquad (1)$$

where the anticipated coefficient signs are indicated above each variable. Table 2 provides more precise variable definitions and data sources, and Table 3 reports the descriptive statistics for all variables in the model.

We estimate equation (1) in linear form with Ordinary Least Squares.[18] Due to some missing observations for some variables, our data pertain to 40 states in 1990 and 1992, yielding a total of 80 observations. Table 4 reports the regression results.

Turning to these results, we find that all coefficients that attain statistical significance are of the hypothesized sign. Moreover, the explanatory power of the model is reasonably high, with 85 percent of the variation in the number of firms across the states in our sample explained by the variables we have included. The individual coefficient estimates provinde empirical evidence that: (1) states with a larger number of long-distance carriers in 1986 continue to have a larger number of these carriers in 1990/92; (2) states with a greater number of intrastate toll minutes have a larger number of interexchange carriers; (3) states with a relatively greater intensity of business customers (lines) have a greater number of interexchange carriers; (4) states with a larger percentage of lines converted to equal access have more interexchange carriers; and (5) states that have opened their intraLATA toll markets to entry have a larger number of interexchange carriers. The coefficient of the profitability variable, PPA, has the wrong sign and is statistically insignificant. This variable may simply be too crude a proxy for profitability to perform as we had expected.

Finally, the estimation result that is of primary interest here is that the coefficient associated with our relaxed regulation variable, DEREG, is statistically insignificant. As a

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[18]Standard diagnostic tests were performed to ensure that our model does not violate any of the stochastic assumptions required by this estimation technique. Specifically, a Ramsey RESET test was preformed to test for misspecification, and a Chow test was conducted to verify the appropriateness of pooling the 1990 and 1992 data. Test results suggest that both the model and estimation technique are warranted.

TABLE 2
Variable Definitions and Data Sources

Variable	Definition	Source
N	Number of long distance carriers purchasing switched access from Bell Operating Companies in 1990 and 1992.	(1)
N86	Number of long distance carriers purchasing switched access from Bell Operating Companies in 1986.	(1)
INTRAMIN	Number of interLATA intrastate billed access minutes in 1991 and 1992.	(2)
BUSINT	Number of business lines divided by the total lines (residential + business) in 1990 and 1992.	(2)
DEREG	Binary variable that equals 1 if the state has removed rate-of-return regulation of AT&T as of 12/31/90 and 12/31/92.	(3)
PPA	P - PA	
P	Real price per minute in 1991 for a 5-minute intraLATA toll call for a 50-mile distance and 1993 estimated AT&T's per minute real price for the same call.	(3)
PA	Carrier access charges per minute (in constant dollar) for 1991 and 1993.	(3)
EA	Percentage of total industry lines converted to equal access in 1990 and 1992.	(4)
INTRACOM	Binary variable that equals 1 if the state authorized the unblocking of intraLATA call as of 12/31/90 and 12/31/92.	(3)&(5)

Sources:

(1) Federal Communications Commission, Industry Analysis Division, Summary of Long Distance Carriers, 1986, 1990, and 1992.
(2) Federal Communications Commission. Statistics of Common Carriers, 1990/91, 1991/92, and 1992/93.
(3) Data compiled by AT&T.
(4) Federal Communications Commission, Industry Analysis Division, Telephone Lines and Offices Converted to Equal Access, 1990 and 1992.
(5) NARUC, NARUC Report on the Status of Competition in Intrastate Telecommunications, 1992.

TABLE 3
Descriptive Statistics

Variable	Mean	Standard Deviation	Minimum	Maximum
N	53.00000	25.91515	14.00000	151.00000
N86	58.70000	36.69595	17.00000	169.00000
INTRAMIN	2536906	4017220	48551	24429090
BUSINT	0.26828	0.04000	0.19270	0.48960
DEREG	0.65000	0.47998	0	1.00000
PPA	0.11343	0.05202	-0.01577	0.25496
EA	90.25213	8.21683	62.82000	99.90000
INTRACOM	0.68750	0.46644	0	1.00000

TABLE 4
Dependent Variable = Number of Firms

Variables	Coefficient	t-Statistic
Intercept	-51.166	-3.077*
N86	0.362	8.433*
INTRAMIN	1.07x10-6	2.587*
BUSINT	213.194	5.581*
DEREG	-3.182	-1.219
PPA	-26.744	-1.132
EA	0.258	1.616**
INTRACOM	6.989	2.694*

$R^2 = .85$
F = 59.107
n = 80
* Significant at the .01 level.
**Significant at the .06 level (one tail test).

result, we cannot reject the hypothesis that reduced regulation of AT&T has had no effect on the number of interexchange carriers that participate in the various states' long-distance markets. Thus, these results reject the more general hypothesis that reduced regulation has resulted in predation.

Several caveats, however, accompany this conclusion. First, while many states (and, since 1989, the Federal Communications Commission) have reduced the stringency of the regulatory controls applied to AT&T's pricing decisions, no state has yet completely deregulated this firm. Therefore, our experience to date is with various degrees of relaxed regulation, not deregulation. It is, of course, possible that complete deregulation might result in patterns of behavior that reduce regulation fails to elicit. Second, at this point in time, the longevity of our experience with reduced regulation in this industry is limited in several states. Some state commissions have only recently removed rate-of-return controls over AT&T. Consequently, there may not yet have been sufficient time for the effects of predation to materialize. And third, over our entire sample period (and still today) the Federal Communications Commission has maintained regulatory authority over AT&T's interstate prices. Consequently, the threat posed by such regulatory oversight might have discouraged any predatory inclinations of this firm. Nonetheless, despite these caveats, our results, in conjunction with the general incompatability of the structure of the long-distance market with predation, appear to place a heavy burden of proof on those parties who continue to oppose deregulation on these grounds.

V. Conclusion

At the time Judge Harold Greene issued his order in the AT&T case in 1982, he seemed to anticipate that the resulting structural separation of long-distance from local service would pave the way for rapid deregulation of the former market.[19] Over a decade later, however, this deregulation has not yet materialized. A variety of potential causes of this prolonged and (in our opinion) unnecessary regulation of AT&T can be identified.[20] Among these, there has been an expressed concern that deregulation might result in predatory behavior by AT&T which could snuff out the competitive market forces rapidly emerging in this industry. This argument that deregulation could lead to predation has been voiced by proponents of continued regulation of AT&T -- primarily this firm's rivals in the long-distance market. To date, it has been largely successful in forestalling more complete deregulation of this firm's pricing decisions.

A reasonably strong *a priori* case can be made that such anticompetitive behavior is unlikely to emerge in this market under deregulation. The structural conditions that exist in the long-distance industry do not appear conducive to predation. Nonetheless, such theory-based arguments have met with only limited success in the policy arena. Potential causes of this lack of success include: (1) the presence of conflicting arguments put forth by the proponents of

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[19]Judge Greene clearly believed that divestiture would eliminate any monopoly power previously held by AT&T. Specifically, he wrote: "Once AT&T is divested of the local operating companies . . . it will be unable to subsidize the prices of interexchange service with revenues from local exchange service or to shift costs to competitive interexchange services." In light of this, the court concluded that "With the removal of these barriers to competition, AT&T should be unable to engage in monopoly pricing in any market." *United States v. AT&T*, 48 PUR 4th 227, 552 F. Supp. at 172 (D.D.C. 1982).

[20]See Kaserman and Mayo, Note 8, supra. Also, see David L. Kaserman and John W. Mayo, "Long Distance Telecommunications Policy: Rationality on Hold," *Public Utilities Fortnightly*, Vol. 122 (December 22, 1988), pp. 18-27.

continued regulation; (2) regulators' inability to distinguish legitimate from illegitimate claims involving competitive market issues; and (3) regulators' obvious incentives to maintain regulation. Together, these factors have enabled AT&T's rivals to employ the regulatory powers of the state for strategic purposes, keeping their major competitor under the thumb of regulatory authorities.

In this paper, we have attempted to buttress the theoretical argument against the predatory pricing hypothesis with empirical evidence. Our findings yield no support for the argument that reduced regulation has resulted in predation. In conjunction with the prior empirical literature relating to this market, the evidence strongly suggests that: (1) long-distance prices have fallen with divestiture and increased competition; (2) these prices have fallen more where regulatory constraints on AT&T have been relaxed; and (3) the price reductions observed have had no predatory effects. Thus, the case for deregulation is strengthened by our results.

David L. Kaserman and John W. Mayo, "Long-Distance Telecommunications: Expectations and Realizations in the Post-Divestiture Period," in Michael A. Crew, Editor, ***Incentive Regulation for Public Utilities***, (Boston: Kluwer Academic Publications), 1994

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LONG-DISTANCE TELECOMMUNICATIONS: EXPECTATIONS AND REALIZATIONS IN THE POST-DIVESTITURE PERIOD

David L. Kaserman
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1. Introduction

While the entire history of the telecommunications industry provides a fascinating case study for any student of government-business relationships, the ten years since the divestiture of AT&T undoubtedly offer the richest decade of social experimentation in the 120-year history of the industry. What began as a decade of theoretical argumentation about the merits of alternative public policies has slowly given way to empirical research that promises to resolve (or, at least, inform) various debates that could not be settled on the basis of theory alone.

Specifically, at divestiture, economists and others expressed conflicting expectations concerning the long-run viability of competitive performance in the long-distance telecommunications market. While some were quite optimistic that separation of long-distance from local service would fulfill the promise of effective competition raised by emerging technological and market forces, others were openly skeptical of the ultimate vigor of competitive rivalry in this market. In addition, some authors expressed concern that, regardless of the ultimate intensity of competition in the long-distance market, impending structural changes might adversely affect other politically important aspects of the industry—particularly local residential rates and universal service.

Ten years later, we are now in a position to appraise the validity of these conflicting views. A considerable amount of evidence now exists that can be used to empirically test the various predictions that were made at divestiture. Such evidence consists of: (1) simple, straightforward observations of how important industry characteristics have evolved in the post-divestiture period; and (2) more rigorous econometric studies of how industry performance has been affected by the various regulatory regimes introduced over the past decade.

Given the experience of this rich ten-year period and the research it has spawned, the purpose of this paper is to trace the evolution of the long-distance industry in

light of the conflicting expectations that were voiced at divestiture. Such a retrospective is useful for several reasons. First, while a number of excellent works document the evolution of the industry prior to divestiture,[1] similar treatments of the post-divestiture period have not yet emerged. Second, to our knowledge, no survey of the burgeoning and most recent economics literature on long-distance telecommunications exists. It is hoped that this paper can serve as a springboard for further study of the industry. Third, the considerable degree of cross-sectional (and, increasingly, time series) variation in regulatory policies toward the long-distance industry has provided economists considerable information that can be used to improve our understanding of the causes and consequences of alternative regulatory regimes. Finally, by better understanding the evolution of the industry, it is possible to gain a clearer picture of emerging issues and potential topics for further research.

The paper is organized as follows. Section 2 describes the three principal attitudes that emerged regarding the prospects for market performance following the 1984 breakup. Section 3 then surveys the empirical evidence pertaining to the structure, conduct, and performance of the industry that is pertinent to the various predictions, forecasts, and guesses that were proffered. Next, Section 4 surveys the growing body of econometric studies on the effects of alternative regulatory policies. Section 5 draws important policy implications from the evidence presented and points out some promising areas for future research.

2. Expectations

Telecommunications industry jargon—regulatory, technological, and economic—has always made it difficult to identify and analyze the important issues facing this industry. For the uninitiated, a prerequisite to doing work in this area has been completion of what is, in effect, a short course in a foreign language. Moreover, this particular language is dominated by acronyms. SPIF and SLU, TS and NTS, LATAs, POPs, POTS, BOCs, LECs, IXCs, etc. all mean something to the inhabitants of this industry. The key, of course, is to translate these acronyms and the underlying terminology they represent into meaningful economic concepts.

Sifting through this jargon, we find that, prior to divestiture, the telecommunications industry was characterized by the following basic conditions. First, the Bell System was *the* nation's telephone company.[2] This company operated at virtually every stage of the vertical chain involved in the provision of telecommunications services, ranging from R&D, to manufacturing, to provision of customer equipment, to inside wiring, to local service, and finally to long-distance service. In the provision of long-distance services, the Bell System's supplier, AT&T Long Lines,

1 See, e.g., Brock (1981), Faulhaber (1987), and Temin (1987).

2 This is not to say that other telecommunications firms did not exist. Hundreds of independent local exchange companies offered service, as did several budding long-distance providers.

provided roughly 90 percent of all long-distance minutes of use sold in the United States. While MCI had entered the long-distance market in 1968, the "competitive fringe" to AT&T remained both small and impeded in their expansion plans by the Bell System's control over local exchange facilities. These facilities were (and are) needed by competitors to reach customers and, thus, to compete effectively in the long-distance market. Competition in the provision of long-distance services was truly at an embryonic stage in 1984, on the cusp of AT&T's divestiture.

Second, the industry was pervasively regulated at both the state and federal levels. The Federal Communications Commission (FCC) intensively regulated a host of economic decisions normally left to private firms, including pricing, quality of services, and investment. Similarly, state public utility commissions (PUCs) thoroughly regulated intrastate telecommunications operations. The policies and decisions of these myriad regulatory agencies were not generally well-coordinated. As a result, the Bell System was constantly being pulled in different directions in the various jurisdictions within which it operated. The result, of course, was hardly a paragon of regulatory efficiency.

A third key feature of the pre-divestiture telecommunications industry was the pervasive presence of subsidy flows across various dimensions of telecommunications services. Under the complex set of rules known as Separations and Settlements, the pricing of services was driven by fully distributed cost allocations that bore no relationship to economically efficient pricing. Under this system, long-distance service subsidized local service, light users of local service subsidized heavy users of this same service, business customers subsidized residential customers, and urban consumers subsidized rural.[3] The resulting subsidy flows were so complex that, a priori, it was not always possible to say whether a given customer was a net payer or recipient of a telephone subsidy.

In this environment, the Department of Justice filed an antitrust suit against AT&T in 1974. This suit ended in 1982 with a consent decree known as the Modification of Final Judgment (MFJ), which was implemented in January, 1984. The goal of this agreement was to provide the foundation for a "truly competitive telecommunications industry."[4] Toward this end, the MFJ contained three major provisions.

First and foremost, it segmented the industry along product lines, requiring the Bell System to reorganize by divesting the Bell Operating Companies (BOCs) from AT&T. This divestiture was the largest corporate restructuring in American history. Its primary purpose was to divide the industry into potentially competitive and non-competitive segments; although as it turns out, the latter segment contains some portions within which competition appears to be feasible as well.

Second, to accomplish this segmentation, it was also necessary to divide the

3 For a more detailed discussion of the evolution of the subsidy mechanism, see Kaserman, Mayo, and Flynn (1990). Also, see Kahn (1984) and Kaserman and Mayo (1994).

4 AT&T, 552 F. Supp. (1982) at 188.

market geographically. Thus, at the heart of the reorganization plan was the Local Access and Transport Area (LATA) concept. Specifically, the geographic territory served by the BOCs was divided into LATAs, which generally centered "upon a city or other identifiable community of interest." The LATAs' boundaries defined the areas within which the BOCs could provide point-to-point telecommunications service (both local and intraLATA toll). For interLATA calling, long-distance telecommunications companies such as MCI, Sprint and AT&T were to compete with one another. Because intraLATA calling is almost exclusively intrastate, however, the divestiture court deferred to the states on the issue of whether and under what terms to permit competition for toll services within these geographic areas.

Finally, the third major provision contained in the MFJ further restricted the scope of BOC activities across the product dimension. Under the agreement, the BOCs are permitted to engage in any activity they choose except: (1) interLATA long-distance services; (2) information services;[5] and (3) the manufacture of telecommunications products or customer premises equipment. All three of these provisions are clearly designed to prevent the sort of monopoly leveraging strategies which were thought to have plagued the industry prior to divestiture.[6]

Expectations—both dire and enthusiastic—surfaced immediately upon announcement of the divestiture agreement. While many economists and policymakers openly embraced the promise of divestiture and long-distance competition, others (including most consumers) simply expressed confusion or skepticism when asked about the likely consequences of the agreement. Some commentators were so caught up in the excitement of the impending change that they inadvertently violated the first law of a successful career in forecasting— they predicted something to come true within their own lifetimes. These prognosticators can be conveniently categorized into three major groups, which we label the Natural Monopoly Advocates, the Universal Service Advocates, and the Competition Advocates. We briefly describe the predictions made by each of these groups at divestiture.

The Natural Monopoly Advocates. This first group of analysts was firmly convinced that the telecommunications industry was a natural monopoly with significant economies of scale within and substantial economies of scope across local and long-distance services. Consequently, the efficient industry structure was thought to be the fully integrated Bell System or its equivalent under another name. As a result, the pro-competitive open-entry policies of the FCC, carried out over

5 This feature of the MFJ was the subject of further court action. Consequently, the BOCs are now permitted to provide information services.

6 The MFJ provides that these line-of-business restrictions shall be removed upon a showing by a BOC that "there is no substantial possibility that it could use its monopoly power to impede competition in the market that it seeks to enter."

the preceding two decades and culminating in the divestiture order, were believed to be a major public policy mistake that would ultimately lead to disaster.

Two alternative scenarios were developed to describe the impending doom. Under one, a liberated AT&T would return to its old tactics, employing predatory pricing to drive its emerging competitors from the market, thereby re-monopolizing the long-distance industry. Under the other scenario, AT&T would tolerate its fledgling rivals, protecting them under a dominant firm price umbrella. The result would be a tight-knit oligopoly with tacitly collusive price leadership used to sustain rates well above competitive levels.

Obviously, under either of these scenarios, barriers to entry would have to exist to prevent the sort of self-correcting market forces envisioned by contestability advocates. According to the Natural Monopoly Advocates, such barriers (of both the Bain and Stigler varieties) emanated from several sources. First, the capital costs of constructing a nationwide telecommunications network were thought to be prohibitive. Second, legal difficulties of obtaining necessary rights of way would raise entrants' costs above those of the incumbent and delay if not prevent such construction. Third, economies of scale inherent both in network operation and advertising would also yield a significant cost advantage to the incumbent firm. And fourth, brand loyalty along with AT&T's embedded customer base would create product differentiation barriers that would prevent new entrants from successfully capturing customers and expanding output. Together, these entry barriers were believed to be sufficient to sustain the monopoly or oligopoly pricing strategies described above.

The Universal Service Advocates. A second group of analysts that emerged at divestiture were essentially agnostic with regard to whether the long-distance segment of the telecommunications industry was an integral part of a natural monopoly. Accordingly, they were also agnostic about the long-run prospects for effective competition in the interLATA market. Nonetheless, these parties expressed serious reservations about the ultimate wisdom of the divestiture decision and the policy path it represented. These reservations focused not on the long-distance market itself but, rather, on the apprehension that, regardless of the intensity of competition in that market, substantial harm might be caused in other areas of significance to pubic policy.

Specifically, two closely related adverse consequences were predicted. First, to the extent that competition would materialize in the long-distance market, toll prices would be driven to marginal and (with entry) average costs. It was argued that the result of such competitive pricing would be elimination of the long-standing cross-subsidization of local residential rates. This loss of the capacity to cross-subsidize, in turn, would force local rates to increase dramatically, causing intolerable inequities and unacceptable political consequences. Second, as a result of these local rate increases, subscribership levels would fall, thereby jeopardizing the Holy Grail of telecommunications policy, viz., universal service. Thus, regardless of the ultimate vigor or merits of long-distance competition, the road ahead was perceived

to be fraught with danger.

The Competition Advocates. The third group was the pro-competitive/deregulation cheerleaders. This group believed that technological change in conjunction with demand growth had eliminated natural monopoly conditions in the long-distance market. Moreover, they also expressed the opinion that this same technological change had removed any significant barriers to entry into the provision of long-distance services. As a result, effective competition would prevail in this market; and, if regulatory restrictions on pricing and the introduction of new services could be removed, consumers would begin to reap the myriad benefits of such competition.

In addition, the Competition Advocates also argued that local rates and universal service would not be jeopardized by the recommended policy for two reasons. First, the cross-subsidization of local rates by toll, if desired, could be maintained through the carrier access charge system that was put in place at divestiture. And second, such cross-subsidization was not necessary in order to promote and sustain universal service anyway. In fact, it was even argued blasphemously that the traditional system of cross-subsidies might actually harm this policy objective. Consequently, this group openly applauded the divestiture agreement and urged policymakers to move rapidly to deregulation.

3. Realizations

A decade after the divestiture, one might think that the economic consequences of this policy action would now be abundantly clear to all observers. In fact, however, they are not. Nonetheless, the passage of time has generated considerable data that are now beginning to permit empirical investigations of issues that were, in the early days following divestiture, debated exclusively on theoretical grounds. Accordingly, we turn now to a series of industry characteristics to examine how these have unfolded. For convenience, we shall organize our discussion around the traditional structure-conduct-performance taxonomy of industrial organization economics.

3.1. Structure

Two fundamental characteristics of industry structure are vital to gauging the evolution of competition in the telecommunications (or any) industry. First, the nature of entry conditions (that is, the height of barriers to entry and expansion) is critical. Second, it is important to understand the configuration of incumbent firms (i.e., market shares) in the market. We deal with each of these in turn.

Prior to the late 1970s, a principal and formidable source of barriers to entry into the interexchange industry existed in the form of regulatory impediments to entry. Specifically, while entry into the long-distance market began with MCI in 1969, it was not until 1977 that the FCC fully embraced the notion of competition for interstate calling.[7] Even with the endorsement of competition by the FCC, state

regulatory bodies remained reticent to embrace competition for long-distance service. Consequently, AT&T's competitors were largely limited to competing only for interstate calls. Subsequent to the divestiture, however, both the FCC and the PUCs have virtually eliminated regulatory barriers to entry for prospective long-distance providers, at least in the interLATA market. Entry requirements for interstate and intrastate/interLATA toll providers are now essentially similar to standard business licensing, with virtually every application for entry being approved by the appropriate regulatory body.

As regulatory barriers to entry have fallen, so have economic barriers. A formidable barrier prior to divestiture existed because potential entrants faced the prospect of having access to the local exchange network denied or provided on discriminatory terms. A key characteristic of the MFJ, however, was to remove any incentive for the local exchange monopolist to favor any one long-distance provider over another (because the BOCs no longer participated in the interexchange market). Moreover, the MFJ explicitly required the BOCs to provide exchange access to all interexchange carriers that was equal "in type, quality, and price."[8] As a consequence of this provision of the MFJ, the BOCs were required to upgrade the access arrangements provided to interexchange carriers so that all long-distance carriers could provide service on a 1+ basis. This "equal access" requirement had the effect of reducing economic barriers to entry by making a vital input available to all long-distance providers on equal rates, terms, and conditions.

From a base of virtually no end offices in the United States that offered equal access at divestiture, over 90 percent of the nation's local telephone lines are equipped with equal access today. The result, in terms of the way that interexchange carriers compete for business, has been dramatic. Indeed, the share of the nation's interexchange traffic that is "nonpremium" (not equal access) is now less than 2 percent. An important consequence of the diffusion of equal access has been the confluence of the basic capabilities of long- distance carriers to offer services to long-distance consumers that are very comparable. The result has been that, despite considerable marketing efforts on the part of long-distance companies, the degree of product differentiation, often thought to be an economic barrier to entry, has fallen precipitously.

Another potential barrier to entry, the degree of capital intensity in production, was also sharply reduced as a result of the MFJ. Specifically, with divestiture, the vast majority of AT&T's capital assets were transferred to the Bell operating companies. As a result, the long-distance industry is no longer capital intense relative to other (unregulated) industries. Today, the largest single expense to

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7 See Brock (1981) and Faulhaber (1987) for thorough accounts of the evolution of the pre-divestiture industry.

8 See Section II of the Modification of Final Judgment, United States of America v. Western Electric Company, Incorporated, and American Telephone and Telegraph Company, Civil Action 82-0192, August 24, 1982.